



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Wynn Peter Holloway  
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For: COMPOSITE ROOF PANELS

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October 5, 2004

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Commissioner for Patents  
P O Box 1450  
Alexandria, Va 22313-1450

TRANSMITTAL OF PRIORITY DOCUMENT

Enclosed herewith is a certified copy of priority document Patent Application GB 0307147.9 filed March 28, 2004 for the above referenced patent application.

Respectfully submitted,

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10/807,955  
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Concept House  
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28MAR03 E795889-1 C03065  
P01/7700 0.00-0307147.9

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THE PATENT OFFICE

28 MAR 2003

NEWPORT

2. Patent application number

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0307147.9

3. Full name, address and postcode of the or of each applicant (underline all surnames)

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OX15 5RS

Patents ADP number (if you know it)

8427676001

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

A Composite Roof Panels

5. Name of your agent (if you have one)

Michael Stanley &amp; Co.

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

P.O. Box 270  
Banbury  
Oxfordshire  
OX15 5YY

Patents ADP number (if you know it)

5884002

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)Date of filing  
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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

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- a) any applicant named in part 3 is not an inventor, or
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## Continuation sheets of this form

Description	10
Claim(s)	3
Abstract	no
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Priority documents	no
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11. I/We request the grant of a patent on the basis of this application.

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26/3/73

12. Name and daytime telephone number of person to contact in the United Kingdom

01295 780729

Michael Stanley

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## Composite Roof Panels

### Field

This invention relates to composite roofing panels and especially panels used for construction of pitched roofs of 5 buildings.

### Background of the Invention

The present invention relates to building construction and in particular to the construction of pitched roofs of dwellings 10 having roofing panels extending between the top of a wall of the building and the ridge.

A roofing panel may have a construction similar to the building panel disclosed in the present applicant's UK patent 15 application GB0306407.8 with reinforcing beams within the panel extending between the wall and the ridge. Adjacent panels may be linked together as is shown in the above application to form a roofing surface ready to receive battens and roofing tiles.

20

The applicant has devised a novel means for securing a roofing panel to both the ridge and wall of a building, and in particular, but not necessarily, to a building having inner walls constructed from modular building panels as are 25 described in the applicants patent application GB0216699.9.

Statements of Invention

According to the present invention there is provided an attachment means for roof panels of a pitched roof, and which 5 comprise an elongate strut in cross-section having substantially the form of a right angle triangle with an apex angle substantially equal to the pitch angle of the roof, and a base side adapted to locate in a recess in the end of the roof panel.

10

The attachment means may be hollow and is formed from a wooden shell, preferably formed from plywood. The hollow centre of the shell may be filled with a core of resin impregnated cellular material.

15

The attachment means may be a lower attachment means which in use is secured to the lower ends of panels adjacent the eaves, and the base side of which has a projecting tongue which engages in the recess in the lower end of the panel 20 such that the two sides of the panel are substantially flush with the respective ends of the base side. Preferably the attachment means has a sufficient length to transverse a plurality of roof panels and link them together. The hypotenuse side of the lower attachment means provide a 25 fixing surface guttering and soffits.

The attachment means may additionally or alternatively be an upper attachment means which in use is secured the upper end of the panels, the base side therof being recessed at on end so that base side engages in a recess in the upper end of a 5 panel, and the hypotenuse side has an inverted "T" shaped slot formed therein for locking onto a ridge beam of a roof.

The cellar material in the core is preferably comprises a plurality of layers of corrugated paper or cardboard which 10 are adhered together using a suitable polmeric resin, for example a water based PVA.

The present invention further comprises a roofing panel having panel having attachment means according to the present 15 invention located at one or both ends of said panel.

Such a roofing panel may have a rectangular frame having both faces face covered in a board material, the frame comprising top and bottom rails formed from "H" or "U" section water 20 resistant composite with recesses facing outwardly of the panel and the two rails are joined together by a plurality of composite "I" beams as described in Patent application 0306408.6 extending therebetween. An advantage of the present invention is that it allows the production of 25 standardised modular roof panels which can adapted for different pitch rooves simply by the use of different

attachment means having a selected apex angle to suit the pitch of the particular roof.

In a method of securing the above roof panel to the ridge beam of a roof the ridge beam is provided with a "T" section location strip which is loosely engagable in an undercut slot in the attachment means with the location strip being locked in the slot by insertion of a locking strip.

10 The lower end of panel is held to angled ends faces of cross beams by eaves brackets.

#### Description of the Drawings

The invention will be described by way of example and with 15 reference to the following drawings in which:

Fig. 1 is an isometric exploded view of a roof panel made from I beams and having attachment means according to the present invention.

20 Fig. 2 is a cross section of a roof panel and attachment means according to the present invention,

Fig. 3 is an isometric view of a hanger for the lower end of the roofing panel.

Detailed Description of the Invention

With reference to Figs. 1, there is shown a roof panel 110 which is a module for building the roof of a dwelling or other building. The panel 110 has predetermined standard dimensions for matching with and assembly to other modular panels, for example width W of 1000mm, thickness T of 130mm, and height H up to 8 metres. Other panels according the present invention may have differences to at least some of the above dimensions.

10

Each panel 110 has a rectangular frame 111, having top and bottom rails 112,113 interconnected by a plurality of I Beams 41 & 10 which respectively form the sides and vertical struts of the frame 111 and are spaced at predetermined distances apart across the width of the panel. A preferred spacing between I beams 10 & 41 is 400mm. A board having a width of 1000mm will only have a single I beam 10 at its centre.

20 The frame 111 is covered on one face, which in use faces externally of the building, with water resistant board 116 and its other face which in use faces inwardly of the building with a second water resistant board 117. The boards 116 and 117 are preferably 6mm plywood or OSB. The internal 25 and external boards 117 & 16 respectively are bonded to the beams 10 & 41.

The top rail 112 comprises a recessed channel in section, and is preferably "H" shaped section channel formed from water resistant wood composite, preferably 12mm plywood .

The bottom rail 113 also comprises a recessed channel in

5 section and is preferably a substantially "U" shaped section rail. The H shaped rail 112 has open sided recesses 43 which face both inwardly and outwardly of the frame 111. The inwardly facing recess 43 receives stepped end portions of the I-beams 10 & 41 and the outwardly facing recess 43

10 receives an elongate strut 102 which is used as an upper attachment means 102 for fixing the panels 110 to the ridge beam of a roof during construction. The bottom rail 113 is oriented with its recess 33 facing downwards to receive an elongate strut 101 which is used as a lower attachment means

15 101. The lower attachment means 101 is used for securing guttering, soffits etc. to the end of the roof panel 110.

A plurality of panels 110 are arranged side by side extending from the ridge of a roof to the eaves to form one side of a

20 roof. Adjacent panels may be linked together using a jointing post (not shown) located in respective recesses 30 on the outer sides of the beams 41. The jointing post engages dowels 31 located along the webs of the respective I beams.

The jointing posts are described in the applicants earlier

25 application 0216699.9.

Referring now also to Fig. 2 each "I" beam 10, 41 is a composite beam fully described in GB 0306408.6 having plywood flanges 11,12 linked by a composite central web 13 so that recesses 30 are formed either side of the web. The 5 overall depth D and width W of the beam 10 will be determined by the end use of the beam and material used for its construction. The present example for a roof panel the beam will be about 100mm x 100mm.

10 The flanges 11,12 are formed from 6mm plywood with the grain of the outer veneers extending longitudinally of the beam.

The web 13 is composite structure comprising two spaced apart sidewalls (not shown) with a light weight cellular material 15 core 14 filling the cavity therebetween. The cellular material is preferably a corrugated paper or cardboard impregnated by a polymeric resin. The two side wall boards may be formed from one of plywood, hardboard, or card board. Composite beams 10 & 41 are structurally very rigid and do 20 not bend under their own weight having an extremely high bending moment per unit mass.

The lower attachment means 101 is substantially in the form of a right angle triangle in cross-section having its base 25 side 51 adapted to engage in the recess 33 in the bottom rail 113 of the roof panel 110. The apex angle  $\alpha$  is substantially

equal to the pitch angle of the roof so that the hypotenuse side 53 is in use substantially vertical. The side 53 is used for the attachment of guttering and/or soffit (not shown). The third side 52 of the attachment means lies substantially flush with the inner board 117. The lower attachment means 101 is preferably hollow and the hollow core may be filled in a similar manner to the I beams 10, 41 if desired. The attachment means 101 may be assembled from machined timber, or plywood, and is of a sufficient length to transverse a plurality of roof panels to link them together at their lower ends.

The upper attachment means 102 is similar to the attachment means 101 and again has a cross-section substantially in the form of a right angle triangle with its base side 61 adapted for location within the recess 43 within the top rail 112. The apex angle  $\beta$  of the attachment means is again substantially equal to the pitch angle of the roof so that the hypotenuse side 63 is substantially vertical in use. The third side 62 is substantially flush with the outer board 116 of the panel 110.

Both attachment means 101 & 102 are secured in their respective rails by screws or nails.

The apex angles  $\alpha$  and  $\beta$  of the lower and upper attachment means 101, 102 are selected to suit a particular roof pitch angle. A number of different attachment means having different select apex angles may be produced. This allows 5 stand panels 110 to be produced and adapted to different roof pitches simply by assembling different select attachment means in the upper and lower rails 112, 113 of the panel.

The roof panel 110 is secured to the ridge beam 65 of a roof 10 by the upper attachment means 102. The hypotenuse side 63 has an inverted T slot 66 formed within the side which is loosely engagable with a T shaped location strip 67 fixed to the ridge beam. The relative dimensions of the slot 66 and location strip 67 are such that the mouth of the slot 66 can 15 pass over head of the retainer strip 67. The upper end of the panel is then lowered so that the head of the retainer strip 67 engages in the detent formed by one arm of the T-shaped slot. The panel is then held on the retainer strip 67 by means of a shaped locking strip 68 which is inserted 20 lengthwise into the slot 66. The upper attachment means 102 may be finally nailed to the ridge beam 65.

The ridge beam 65 is a composite rectangular section beam of 25 a similar construction to the I beams 10 & 41. The ridge beam 65 comprises an outer shell 69, preferably plywood, having

a core filled with a resin impregnated cellular filler, preferably corrugated cardboard.

The lower ends of the panels 110 are located on the shaped 5 ends of cross beams 71 which form the ceiling immediately below the roof. The lower ends of the panels 110 are secured in position using shaped eaves brackets 72, see Fig. 3, which are secured to the cross-beam 71 and to the interior board 117 of the panel. The brackets 72 have a planar base 73 which 10 sits against the underside of the panel and a pair of spaced apart side walls 74 which locate one on each side of the beam 71. The bracket 72 is fastened to the beam 71 and panel 110 using conventional fasteners e.g. nails, screws etc.

15 The panels 110 may be supplied already covered with roofing felt or membrane 75 and with longitudinally extending battens 76 fixed in position. The battens 76 will be aligned with and fixed to the I beams 10, 41 within the panels and are utilised for the attachment of the battens for the roofing tiles, 20 slates etc.

Alternatively once a plurality of roofing panels 110 are secured to form a roof surface, the surface may be felted and battened.

Claims

1. An attachment means for roof panels of a pitched roof, and which comprise an elongate strut which in cross-section has substantially the form of a right angle triangle whose apex 5 angle is substantially equal to the pitch angle of the roof and the base side of which is adapted to locate in a recess in the end of the roof panel.
2. Means as claimed in Claim 1 wherein the elongate strut is 10 hollow having an outer shell formed from a suitable material.
3. Means as claimed in Claim 2 wherein the hollow centre of the strut may be filled with a core of resin impregnated cellular material.

15

4. Means as claimed in any one of Claims 1 to 3 wherein the attachment means is a lower attachment means which in use is secured to the lower ends of panels adjacent the eaves, the base side having a projecting tongue which engages in the 20 recess in the lower end of the panel such that the two sides of the panel are substantially flush with the respective ends of the base side.
5. Means as claimed in Claim 4 wherein the lower attachment 25 means has a sufficient length to transverse a plurality of side by side roof panels and link them together.

6. Means as claimed in Claim 4 or Claim 5 wherein the hypotenuse side of the lower attachment means provides a fixing surface for guttering and soffits.

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7. Means as claimed in any one of Claims 1 to 3 wherein the attachment means is an upper attachment means which in use is secured the upper end of the panels, the base side being recessed at one end so that base side engages in a recess in 10 the upper end of a panel, and the hypotenuse side has an undercut slot formed therein for locking onto a ridge beam.

8. Means as claimed in Claim 7 wherein the undercut slot is in the form of an inverted "T".

15

9. A roofing panel having attachment means according to the Claims 1 to 8 located at one or both ends of said panel.

10. A roofing panel as claimed in Claim 9, wherein the panel 20 comprises a rectangular frame having both faces face covered in a board material, the frame comprising top and bottom rails formed from "H" or "U" section water resistant composite with recesses facing outwardly of the panel, and the two rails being joined together by a plurality of 25 composite "I" beams, and the attachment means are located in said recesses in the top and bottom rails.

11. In a method of securing a roof panel as claimed in 10  
when dependant upon Claim 7, to the ridge beam of a roof, the  
ridge beam is provided with a "T" section location strip  
which is loosely engagable in the undercut slot in the  
5 attachment means, the location strip being locked in the slot  
by insertion of a locking device.

12. In a method as claimed in Claim 11, the open undercut  
slot is passed over the head of the location means and the  
10 locking strip is pushed lengthwise through the slot the lock  
the panel to the ridge beam.

13. A method as claimed in Claim 11 or 12 wherein the lower  
end of panel is held to the angled ends faces of ceiling  
15 cross beams by eaves brackets.

14. A method of securing a roof panel to a ridge beam wherein  
the roofing panel is provided with at least one attachment  
means as claimed in any one of Claims 1 to 8 wherein the  
20 attachment means is selected from a plurality of attachment  
means having different apex angles such that the apex angle  
of the select attachment means is substantially equal the  
pitch angle of the roof.

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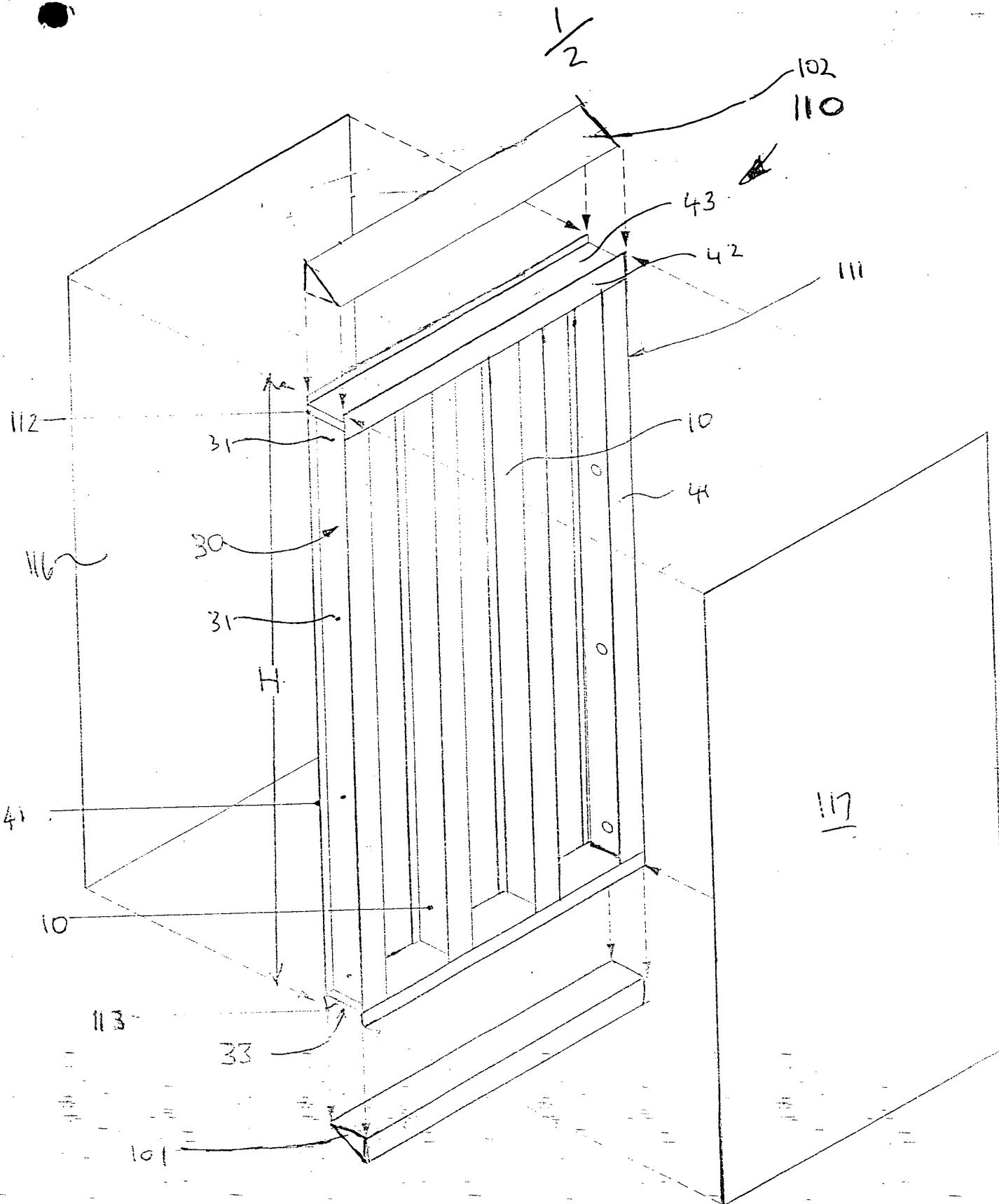
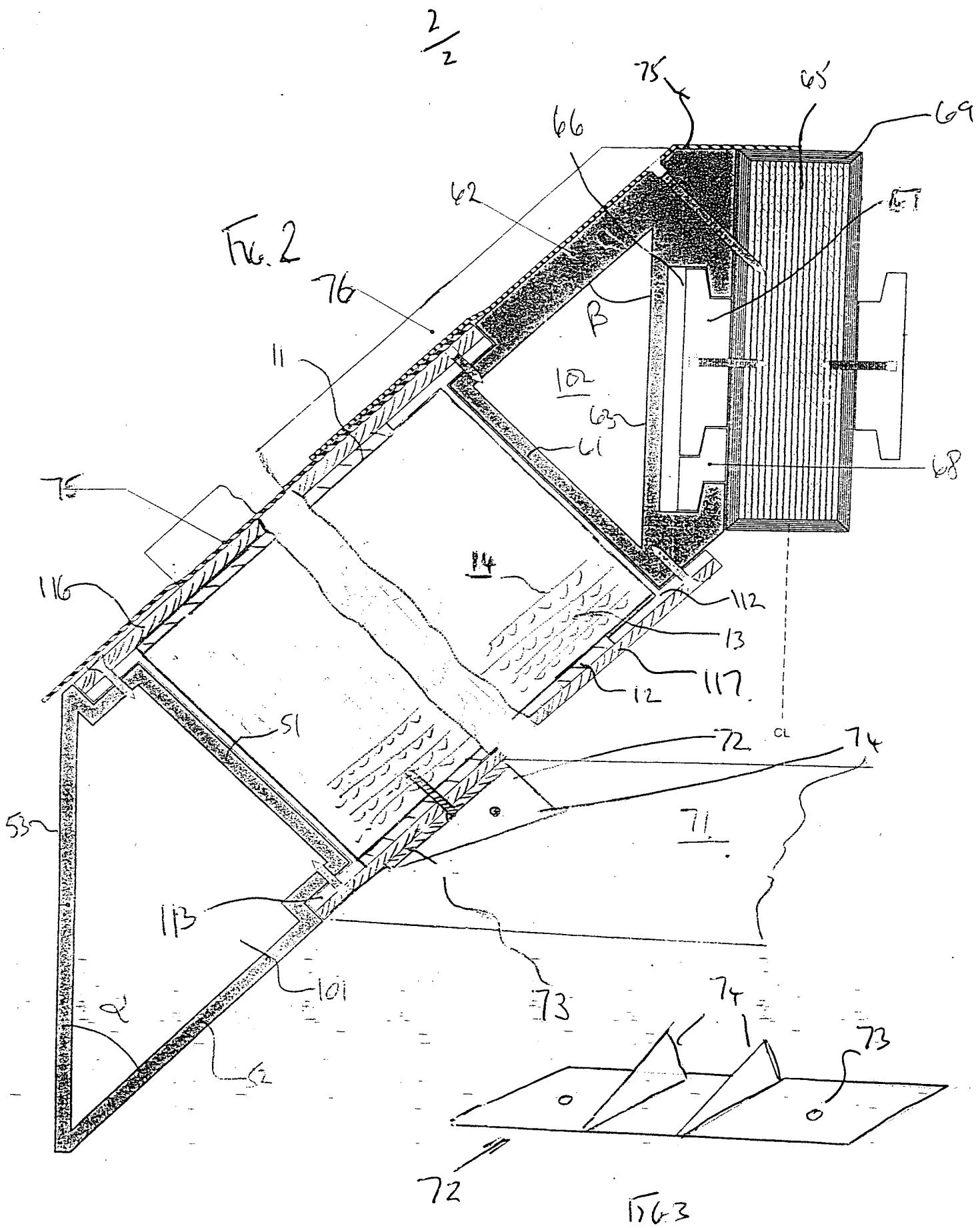


Fig 1

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